

WHAT IS CLAIMED IS:

1. A thermoelectric element comprising:
at least two hetrostructure thermoelectric portions of the same conductivity type; and
an electrically conductive material coupled to the thermoelectric portions.
2. The thermoelectric element of Claim 1, wherein the electrically conductive material comprises at least one electrode.
3. The thermoelectric element of Claim 1, wherein the hetrostructure thermoelectric portions form layers.
4. The thermoelectric element of Claim 3, wherein the electrically conductive material is coupled to the layers at at least one end of the layers.
5. The thermoelectric element of Claim 3, wherein the electrically conductive material is coupled to at least the top or bottom of the layers.
6. The thermoelectric element of Claim 1, wherein the hetrostructure thermoelectric portions form wires.
7. The thermoelectric element of Claim 6, wherein the electrically conductive material comprises at least one electrode.
8. The thermoelectric element of Claim 7, wherein the electrically conductive material is coupled to the wires at at least one end of the wires.
9. The thermoelectric element of Claim 7, wherein the electrically conductive material is coupled to at least the top or bottom of the wires.
10. The thermoelectric element of Claim 1, further comprising a bonding material between the at least two hetrostructure thermoelectric portions.
11. The thermoelectric element of Claim 10, wherein the bonding material is configured to reduce the power density of the thermoelectric.
12. The thermoelectric element of Claim 10, wherein the bonding material is configured to reduce shear stress in the layers when the thermoelectric element is operated.
13. The thermoelectric element of Claim 2, further comprising an intermediate material between at least one hetrostructure thermoelectric portion and the at least one electrode.

14. The thermoelectric element of Claim 13, wherein the intermediate material is configured to reduce shear stress in the heterostructure thermoelectric portions when the thermoelectric element is operated.

15. The thermoelectric element of Claim 14, wherein the intermediate material is resilient.

16. The thermoelectric element of Claim 1, wherein the heterostructure thermoelectric portions are of substantially the same thermoelectric material.

17. The thermoelectric element of Claim 1, wherein at least one of the heterostructure thermoelectric portions comprises at least two layers of heterostructure thermoelectric material.

18. A thermoelectric element comprising:
at least two layers of substantially the same thermoelectric material and of the same conductivity type; and
at least one electrically conductive material coupled to the thermoelectric material.

19. The thermoelectric element of Claim 18, wherein the electrically conductive material comprises at least one electrode.

20. The thermoelectric element of Claim 18, wherein the electrically conductive material is coupled to the layers at at least one end of the layers.

21. The thermoelectric element of Claim 18, wherein the electrically conductive material is coupled to at least the top or bottom of the layers.

22. The thermoelectric element of Claim 18, wherein the layers form wires.

23. The thermoelectric element of Claim 22, wherein the electrically conductive material comprises at least one electrode.

24. The thermoelectric element of Claim 23, wherein the electrically conductive material is coupled to the wires at at least one end of the wires.

25. The thermoelectric element of Claim 23, wherein the electrically conductive material is coupled to at least the top or bottom of the wires.

26. The thermoelectric element of Claim 18, further comprising a bonding material between the at least two layers.

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27. The thermoelectric element of Claim 26, wherein the bonding material is configured to reduce the power density of the thermoelectric.

28. The thermoelectric element of Claim 26, wherein the bonding material is configured to reduce shear stress in the layers when the thermoelectric element is operated.

29. The thermoelectric element of Claim 28, further comprising an intermediate material between the at least one electrode and at least one layer of the thermoelectric material.

30. The thermoelectric element of Claim 29, wherein the intermediate material is configured to reduce shear stress in the layers when the thermoelectric element is operated.

31. The thermoelectric element of Claim 29, wherein the intermediate material is resilient.

32. The thermoelectric element of Claim 18, wherein the at least two layers are hetrostructures.

33. The thermoelectric element of Claim 32, wherein at least one of the hetrostructures comprises at least two layers of hetrostructure thermoelectric material.

34. A method of producing a thermoelectric device comprising the steps of:
layering at least two hetrostructure thermoelectric segments ; and
connecting at least one electrode to the segments.

35. The method of Claim 34, wherein the step of layering comprises bonding said at least two hetrostructure thermoelectric segments with a bonding material.

36. The method of Claim 35, further comprising the step of providing an intermediate material between at least one of the at least two hetrostructure thermoelectric segments and the at least one electrode.

37. The method of Claim 36, wherein said bonding and intermediate materials are configured to decrease power density.

38. The method of Claim 34, wherein the step of connecting comprises connecting electrodes at the ends of the segments.

39. The method of Claim 34, wherein the step of connecting comprises connecting electrodes at the top and bottom of the segments.

40. A method of producing a thermoelectric device comprising the steps of:

forming at least two layers of substantially the same thermoelectric material;
and

connecting at least one electrode to at least one of the layers.

41. The method of Claim 40, wherein the step of forming comprises bonding said at least two layers with a bonding material.

42. The method of Claim 41, wherein said bonding material is configured to decrease power density.

43. The method of Claim 40, wherein the step of connecting comprises connecting electrodes at the ends of the layers.

44. The method of Claim 40, wherein the step of connecting comprises connecting electrodes at the top and bottom of the layers.